THE

URBAN DISTRICT COUNCIL

OF

WIRKSWORTH.

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ANNUAL REPORT

OF THE

MEDICAL OFFICER OF HEALTH

FOR

THE YEAR 1897.

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PRINTED BY ORDER OF THE COUNCIL.

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OF

WIRKSWORTH.

STATISTICS.

Area, in acres, 3020.

Population (1891), 3725. Estimated in 1898, 3755.

Houses inhabited, 943. Uninhabited, 44.

Rateable value, £13,183.

Assessable value, Houses	£7759	3	3
,, ,, Lands	1356	1	11
	£9115	5	2

Amount of last rate at 1s. 4d. in £ ...	£607	14	2
,, previous rate at 1s. 2d. in £..	531	16	2

Total births, 108. Total deaths, 65.

Birth-rate, 28·8. Death-rate, 17·31.

Deaths of Infants under one year to 1000 births registered, 175·9.

Zymotic death-rate, ·26. Phthisis death-rate, 1·6.

Total notifications (Infectious Diseases Notification Act), 7.

Average monthly flow from springs, 7314 gallons per hour.

Maximum flow (March), 14,000 gallons per hour.

Minimum flow (November), 2208 ,, ,,

To the Chairman and Members of the Urban District Council of Wirksworth.

Gentlemen, —

I beg to submit to you my Report for the year 1897.

There was no epidemic, and during the first eight months not a single case was notified under the Infectious Disease (Notification) Act, 1889. In the last four months there were seven notifications, viz.:—Scarlet Fever, 2; Typhoid Fever, 3; Erysipelas, 2. The comparative absence of Scarlet Fever is due to the thorough disinfection of houses by your Council's officers, under the Infectious Disease (Prevention) Act (adopted in your district in December, 1893). One of the cases of Typhoid Fever came from Chesterfield, the other two occurred in a house in which there had been a case in 1896. An exhaustive enquiry was made, but no clue to the outbreak could be discovered, although some local sanitary defect appeared to be the most probable cause.

The population in 1897 is estimated at 3755. There were 108 births (65 males, 43 females), making a birth-rate per 1000 of 28·8. The death-rate of children under one year to 1000 births was

175·9. There were 19 deaths of children under one year, of whom 7 were certified as premature births. Deducting the deaths from premature births, the death-rate of children under one year to 1000 births was 111·1.

The total deaths belonging to the district was 65 (males 28, females 37), which is equivalent to a death-rate of 17·31 per 1000. Deducting the 7 deaths from premature births, the death-rate for the year is 15·4. Fourteen persons died over 70, one over 80, and one over 90.

The zymotic death-rate per 1000 living was ·26, one of the lowest recorded. The death-rate from phthisis per 1000 living was 1·6, also one of the lowest recorded.

Judging the health of the community by its death-rate, zymotic death-rate, infant mortality, and phthisis death-rate, making allowance for the seven deaths due to premature birth, the health of the district in 1897 may be considered satisfactory.

The following is a summary of sanitary work done in the Inspector of Nuisances department during the year 1897 :—

		Inspections and Observations made.	Informal Notices served by Inspector.	Legal Notices served by Authority.	Nuisances abated after Notice.
Dwelling-Houses.	Foul Conditions	18	6		6
	Structural Defects	123	41		41
	Overcrowding	6	2		2
	Lodging-House	10			
	Cowsheds	6	1		1
	Bakehouses	5			
	Slaughter-Houses	5			
	Ashpits and Privies	186	62		62
	Deposits of Refuse and Manure	8	2		2
	Water Closets	2	1		
House Drainage.	Defective Traps	15	5		5
	No Disconnection	42	14		14
	Water Supply	231	77		77
	Animals Improperly Kept	2	1		1
	Totals	659	212		211

Houses Disinfected after Infectious Disease, 3.

Between August, 1896, and March, 1897, the whole of your district was systematically inspected by your Sanitary Inspector (Mr. Diver). He found in the poorer quarters of the town large accumulations of midden filth and ashes, a great number of slopstones in direct connection with drains, the majority of privy middens defective, and many instances of rubble drains passing under dwellings. All the nuisances were abated, and Mr. Diver reports, as the outcome of his periodical visits since that time, that the middens and ashpits in the

district have been emptied regularly and are in good condition.

WATER.—The following are your Water Bailiff's monthly statements, showing number of gallons per hour flowing into the reservoir at the beginning of each month :—

Month.	Gallons per hour.
January	11,760
February	11,870
March	14,000
April	10,000
May	7,000
June	6,000
July	4,428
August	3,192
September	2,952
October	2,460
November	2,208
December	11,800

The Rainfall measured at Bridge House in 1897 was as follows :—

					United Kingdom.
January	2·65 inches	in	13	rainy days	2·66 inches.
February	3·89 „		18	„	3·10 „
March	3·66 „		20	„	4·13 „
April	2·42 „		13	„	3·37 „
May	1·29 „		11	„	1·69 „
June	3·98 „		11	„	2·57 „
July	0·94 „		7	„	1·39 „
August	3·09 „		17	„	4·09 „
September	3·72 „		14	„	3·66 „
October	1·48 „		12	„	2·87 „
November	3·55 „		13	„	—
December	4·65 „		18	„	—
Total	35·32 „		167	„	

Annual Rainfall at Bridge House since 1890 :—

1890...26·67	inches.	1894...29·55	inches.
1891...40·66	„	1895...32·36	„
1892...28·69	„	1896...32·4	„
1893...22·77	„	1897...35·32	„

Average rainfall for the last eight years, 31·05 inches.

Your water comes from the millstone grit, which caps the hill to the east of the town. In the words of Mr. Mansergh, "the millstone grit is a kind of natural reservoir in which your water is stored, the quantity impounded being in proportion to the rainfall on the percolation area above." The springs issue on the side of the hill at the base of the strata, about 790 feet above Ordnance datum, and about 270 feet above the Market Place. These springs were allotted to the inhabitants of Wirksworth under an Act of Parliament in 1802 (42 George III., cap. 110), and in 1880 by a Provisional Order of the Local Government Board for partially repealing and altering the Act, they were transferred, with all rights appertaining to the supply, to the Local Board, for the benefit of the whole of the Urban Sanitary District of Wirksworth. They are situated in 12·629 acres of land, part of which was allotted with the springs, and the remainder bought by the Local Board at an auction sale, in 1886, for £370. In addition, the sum of £63 17s. was paid for enfranchisement, making the total outlay £433 17s. This money

was borrowed at 3½ per cent., and on March 31st, 1898, there will be £270 still owing.

The water is pure, clear, cool, and sparkling, and is good for drinking, cooking, and washing. The following is an analysis of the water, by Mr. A. J. Bernay :—

	Grains in one gallon.
Sulphate of Lime	0·6500
Bicarbonate of Lime	2·4480
Bicarbonate of Magnesia	0·1370
Bicarbonate of Iron	0·0090
Carbonate of Soda	traces
Chloride of Sodium	0·0258
Silicia	0·0080
Carbonate of Potash	traces
Organic matter	1·1210
Free Carbonic Acid	7·2160

Its specific gravity is 1·00014.

He adds, "It is beautifully clear and sparkling, very soft, and available for every household purpose. It contains a large amount of carbonic acid, to which the briskness of this water is owing. It is just such a water as one would expect from the millstone grit, and I have no hesitation in saying that no town in England is supplied with one of better quality."

In October, 1878, an analysis was made by Mr. H. S. Bell, for the Local Board, with the following result :—

Free Ammonia	·02 per million.
Organic Ammonia	·04 „
Total Solids	8 grains to one gallon.
Volatile matter	4 „ „
Fixed Solids	4 „ „
Chlorine	2 „ „

The hardness was estimated by Clark's process.

Permanent Hardness	4·5 degrees.
Hardness removed by Boiling	0·0 „
Total Hardness	4·5 „

"Each degree represents a grain of Carbonate of Lime in the gallon. The results of the examination prove the water to be of very excellent quality, and in every way suitable for the supply of a town."

In 1896 your Council submitted to the County Council Analyst three samples—one from the reservoir, one from the main in the Market Place, and one from a house. He reported that they were well adapted to supply the community. The only contamination has been through rust from the dead ends of pipes, which is remedied by flushing the mains. The supply is permanent, and shows no signs of falling off. It varies from year to year in direct relation to the *winter* rainfall. The summer rainfall has very little effect on the springs. The following table gives the average number of gallons per hour in each year since 1884 :—

Year.	Average gallons per hour.	Rainfall. Inches.
1884	5884	—
1885	6195	—
1886	7923	—
1887	4901	—
1888	4660	—
1889	6115	—
1890	4621	26·67
1891	6470	40·66
1892	7030	28·69
1893	4380	22·77
1894	4405	29·45
1895	4596	32·36
1896	4433	32·4
1897	7314	35·32

In seven out of the fourteen years the supply averaged between 4000 and 5000 gallons per hour. In the remaining seven it averaged between 5000 and 8000 gallons per hour. Taking your requirements, as I shall presently shew, at 4000 gallons per hour, your springs have proved themselves over a period of fourteen years to be equal to your requirements. The water, however, does not flow evenly throughout the year; in each year there is a period of maximum flow and a period of minimum flow, the latter occurring in the summer and autumn, when water is most needed for flushing sewers and watering streets. I have prepared a chart from your Water Bailiff's monthly returns, shewing the monthly rise and fall in your water supply during the last fourteen years, and on this

chart are shewn the monthly fluctuations in relation to the rainfall during the last five years.

The requirements of your district may be placed at 25 gallons per head per day, which is equivalent to a flow of 4000 gallons per hour. Experience has shewn us that we are unable to keep up a constant supply to the householder with less than 4000 gallons per hour, and this amount is necessary to keep the sewers properly flushed. A black horizontal line on the chart indicates the 4000 gallons per hour level, and you can see how in each year, except one (1891), for a longer or shorter period, the flow from the springs has been below your requirements.

The following table shews, year by year, since 1884, the number of gallons of surplus water flowing, over and above your requirements of 4000 gallons per hour, during the months of maximum flow immediately preceding the annual deficit, and it also shews the total amount you were short of 4000 gallons per hour in each year, in the months of minimum supply. You will observe that the surplus in each year has invariably covered the deficit. In only one year (1896) was the margin of surplus narrow, and in this year the rainfall was 32·4 inches, or an inch above the average. The explanation is that of the 32·4 inches of rain, 6·38 inches fell in September, without any marked effect

on the springs, and 5·858 inches fell in December, the effect of which was not felt until January, 1897. There were two periods of exceptional and prolonged drought, viz., ten months in 1887-8, with a deficit of 10,730,400 gallons; and seven months in 1893, with a deficit of 8,392,800 gallons. In 1887 the surplus was 21,331,200 gallons; and in 1893, 13,764,000 gallons. Your springs have yielded ample to have carried you comfortably through any year since 1884 if the surplus water had been stored.

Year.	Rainfall in inches.	Remarks on Rainfall.	Months of Maximum flow immediately preceding deficit.		Months of Minimum flow.	
			Number of Months.	Total Surplus over 4000 gallons per hour.	Number of Months.	Total Deficit below 4000 gallons per hour.
1884	—	—	Six.	20,661,600 gallons.	Six.	5,128,800 gallons.
1885	—	—	Four.	13,598,400 ,,	Three.	2,349,600 ,,
1886	—	—	Eight.	28,992,000 ,,	Two.	1,471,200 ,,
1887	—	—	Six.	21,331,200 ,,	Ten.	10,730,400 ,,
1888	—	—	Three.	4,008,000 ,,	Three.	436,800 ,,
1889	—	—	Seven.	17,496,000 ,,	Two.	964,800 ,,
1890	26·67	4·366 below average.	Five.	8,406,000 ,,	Five.	6,175,200 ,,
1891	40·66	—	—	—	—	No deficit.
1892	28·69	—	Five.	24,528,000 ,,	Two.	1,020,000 ,,
1893	22·77	—	Six.	13,764,000 ,,	Seven.	8,392,800 ,,
1894	29·55	—	Four.	8,016,000 ,,	Seven.	3,943,200 ,,
1895	32·36	5·53 inches in July.	Four.	7,776,000 ,,	Six.	4,761,600 ,,
1896	32·46	6·38 inches in Sept., and	Five.	5,001,000 ,,	Five.	4,272,000 ,,
1897	35·32	5·85 inches in Dec., 1896.	Six.	25,344,000 ,,	Four.	4,380,000 ,,

Your present storage is about 40,000 gallons, and is not worthy of consideration as such. Mr. Radford, of Nottingham, in December, 1890, advised the Local Board to construct a reservoir to hold 3,000,000 gallons, but, with the records of the springs extending over twice the period on which that estimate was based, I think he would wish to correct his estimate. By referring to the table of annual deficits below 4000 gallons per hour, you will see that a reservoir of 3,000,000 gallons would have been inadequate in eight of the fourteen years. Seven of the fourteen years would have required storage of, at least, 5,000,000 gallons: and if your Council decides to construct a reservoir this seems to indicate its minimum capacity.

There are said to be seven miles of mains in your district. These were laid in 1882 on the plans of Messrs. Coke and Mills, of Chesterfield, at a cost of £4000, which was borrowed in 1882 from the Public Works Loan Commissioners at $3\frac{3}{4}$ per cent., with repayment extended over 30 years, and of which on March 31st, 1898, £1913 will still be owing. The whole of the pipes were newly cast, and coated with Dr. Angus Smith's composition, composed of pitch, pure naphthaline, and prepared oil.

Water is delivered throughout the district on the "constant" plan; there is no storage in the

houses except for water-closets and kitchen boilers. With the "constant" plan the chief waste arises from pipes and joints. Mains laid in 1882 should still be sound, but there is undoubtedly considerable waste from leakage. On the 31st May last, at a time when your Water Bailiff reported 7000 gallons per hour (equivalent to 44 gallons per head per day), you had not sufficient water for a constant supply, and were obliged to turn it off during the night. Recently Mr. Diver measured the flow into the reservoir at 1 a.m. and 6.30 a.m. on a Monday morning. He found that during that time 29,235 gallons of water ran into the reservoir, of which 8789 gallons had been stored and 20,446 gallons had run away through the mains in $5\frac{1}{2}$ hours of the day when no water was being used by householders. This shows an enormous waste and the necessity of having the mains throughout the district thoroughly tested. It would be well in future to have the amount of waste estimated every three months, and the yield of the springs should be recorded once a week in "gallons per day" instead of "gallons per hour."

During the year seven leakages arising from corroded and blown-off ferrules were detected and remedied, and seventy-seven notices were given to householders to stop waste. With the "constant" plan common taps don't answer, and the best screw-down taps should be used.

The temperature records for the year will be found below. I am sure your Council desire to join me in thanking Mr. Gibbs for his kind assistance in providing us with the rain and temperature records.

I have the honour to be,
Gentlemen,
Your obedient servant,
A. E. BROSTER.

Wirksworth,
February 28th, 1898.

Months.	Mean Max.	Mean Min.	Mean.	Highest.	Lowest.	Temp. United Kingdom.
January	36	28	32 2/6	48	22	39
February	44 7/9	36 6/9	40 7/9	54	28	44
March	48 8/10	36 7/10	43	56	28	44
April	49 1/6	37 7/30	43 1/5	61	29	45
May	56 1/2	42 1/2	49	66	31	49
June	66 8/10	52 1/5	59 1/2	77	40	55
July	66	50	58	75	43	60
August	68	51 1/2	59 2/3	83	44	61
September	59	44 5/6	52	65	36	55
October	54 3/5	41 3/5	44 1/2	64	35	52
November	45	38 2/5	43 1/5	55	32	—
December	44 1/2	33 1/2	38 3/4	56	24	—